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ABSTRACT

The author discusses the impact of the "computer revolution" on the field of rhetoric and public address in terms of the potential applications of computer methods to rhetorical problems. He first discusses the computer as a very fast calculator, giving the example of a study that probably would not have been undertaken if the calculations had had to be done manually. Clevenger then points out the advantages of the computer for information retrieval--especially for tedious, time-consuming projects--and suggests further use of the computer for preparation of concordances. He gives examples of the computer's potential uses for content and stylistic analyses, and he suggests methods whereby computer simulations could be used for rhetorical studies, such as predictions of audience response under given conditions. Finally, Clevenger discusses the computer as a "low-grade creative thinker," whereby the machine might generate a few useful questions or ideas concerning certain rhetorical statements or analyses. (RN)

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some uses of computers in rhetoric and public address

by Theodore Clevenger, Jr

For some time we have all known that our personal lives would be deeply affected by the computer revolution; but in speech, and particularly in rhetoric and public address, we have assumed until quite recently that its impact on our professional lives would be negligible. Computers compute, and computation is not used in rhetoric. From that point of view, the computer and the rhetorician seem to belong in different worlds.

But to adopt that view is to allow oneself to be misled by words. The term "computer" is a poor name for a modern electronic data processing machine, for numerical calculation represents only a small fraction of its total capability. Registration procedures at most large universities demonstrate that computers can deal with words as well as numbers. In fact, they can handle any sort of symbols whatsoever, and this flexibility is potentially very valuable to rhetoric and public address.

First, I would like to discuss some applications of computer methods to rhetorical problems or to problems in other fields that are clearly analogous to rhetorical problems, so as to suggest what the computer holds in store for rhetoric. Second, I would like to provide some references to published materials that can serve as a starting point for anyone who wants to pursue this matter further.

Let us begin our survey at the most obvious point—with studies that use *the computer as a giant calculator*. We were able to calculate by hand before electronic data processing—or EDP—so we tend to overlook what the computer has done to quantitative research in rhetoric and public address.

To illustrate that contribution, let me mention one representative study.[1] In probing the images of Johnson and Goldwater for an experiment reported at the 1964 SAA convention, we gave a semantic differential of 106 scales to each of 120 undergraduate students. To analyze the underlying factor structure of these scales, we had to first calculate the correlation of every scale with every other scale—a total of more than 5,500 correlation coefficients. Figuring that it would take an assistant about 45 minutes to do one of these, and figuring an assistant at 20 hours per week, 36 weeks per year, then it would have taken seven assistants all year to calculate these coefficients. Figuring a research assistant at $2,000.00 per year, that comes to $14,000.00 for the coefficients alone. The factor analysis would still remain to be done, and to anyone who has ever performed a factor analysis on a desk calculator, the prospect of a 106-by-106 matrix is almost overwhelming.

Yet an IBM 7070 (by no means one of the fastest machines) calculated the coefficients and extracted and rotated 11 factors in about 20 minutes, at a cost of $50.00. Of course, the data first had to be put on cards. That took about two hours and cost less than $10.00. Two hours of assistant time and 20 minutes of machine time, at a total cost of less than $60.00 performed operations that would have taken seven academic years of assistant time and more than $14,000 to perform by hand. The implications of this comparison are clear. Before the computer, this sort of analysis would never have been performed. As a matter of fact, in the field of speech, it never was. The computer has done more than just speed up statistical work in speech, it has made certain kinds of very complex statistical work available to us for the first time.

The change this has wrought in experimental rhetoric is more than quantitative—it is qualitative. Quantitative and experimental work have always been criticized in the past for being too mechanical and simplistic. Using complex designs and analyses placed within our grasp by computers, we can bring statistical work into closer harmony with the realities of rhetorical practice.

After statistical calculation, the next most widely publicized use of computers is in *information retrieval*. When one thinks of information retrieval, he thinks first of indexes and similar aids to library research.

For most of us, the least rewarding phase of any research project is working in the library. Not only is it tedious, but it is highly susceptible to error. Because we do not wish to search for needles in haystacks, we do not examine every article or book in which some relevant reference might have been made. Rather, we explore in detail only those sources in which we feel that there is considerable likelihood of our finding important references, and we ignore the rest.

Yet a computer does not mind looking for a needle in a haystack. If you can afford to pay the

electricity and maintenance bill, it will read all day, and incomparably faster than a hundred humans. Three years ago at the University of Pittsburgh, we calculated that it should be possible to store all of the articles published in the national and regional speech journals on a single reel of magnetic tape, not just the titles, but the full texts. Using a program developed by the computation center there, the entire tape could be read in just a little over six minutes, and every occurrence of a particular word or phrase printed out—in context, with its location specified—for journal, volume, number and page. Thus, for the publications of the Speech Association of America and its regional affiliates, a search could be made in a few minutes exceeding in thoroughness a visual search that would require several days. Of course, many rhetoricians would find relatively little use for such a knowledge-availability system based on the speech journals, but the principle can be extended to French rhetorics, existential philosophers, or any other body of literature whatsoever. Such an electronic library would assure the user that a given body of material had been covered thoroughly; by providing a highly flexible superspeed index, it would accelerate the early and least rewarding stages of scholarly inquiry.

Not only it is possible to use the computer as the central organ of a high-speed information system, but it can also be used to create more conventional information retrieval devices, such as computer-based concordances. We developed one such concordance of the Kennedy-Nixon debates, similar to many others in English literature, poetry and allied topics.[2]

If concordances were available for all of the major rhetorics and for certain key collections of speeches, comparative studies ought to be somewhat easier and hence more common than they are today. At the very least, concordances would reduce much of the fruitless labor of graduate students.

If concordances are so valuable, why do we not have more of them? Mostly because it takes time to prepare a concordance by conventional means and (let us face it) a distinct flair for the unimaginative. The advantage of the computer is that it doesn't mind having its imagination shackled, and it uses far less time than people do, so that computer-based concordances are possible on a wholesale scale. Once written, a computer program for generating a concordance of one work can be used with little or no additional programming for many other works. There is no reason why a graduate student should not do a concordance on a rhetoric or a collection of speeches in which he is doing his research project. Once it has been produced for a particular study, the concordance can be used by anybody at a later time. It becomes part of the scholarly resources of the discipline.

The major bottleneck in concordance making is input. Generally nowadays, whatever material is to be concorded must first be prepared in machine-readable form, usually on IBM cards. Our cards for the Kennedy-Nixon debates filled two file drawers, and were time-consuming and expensive to prepare. But there are signs that this bottleneck may soon be breached. More than a dozen computer research centers are now working on visual pattern-recognition programs. When perfected, these will permit the computer to read for itself directly from the printed page.[3] Some pattern recognition programs are in existence already, they are slow and costly now, but they are being improved all the time. Someday they will make concordance-making a cheap and easy proposition.

Because concordances are already relatively easy, rhetoricians should now be thinking about the kinds of concordances that will be most valuable to them, and should set some standards, so that concordances on different works done at separate centers will be compatible. A conference should be called among rhetoricians, computermen, and experienced concorders from other disciplines to lay out an ideal design for rhetorical concordances so as to maximize the capital gains from such concordance work.

There is another computer application that falls in this general category. During the past half-dozen years, strong efforts have been made to develop automatic abstracting programs, instructions that enable a computer to take as input an article or speech and produce an abstract of it as output.[4] From time to time, scholars have toyed with the idea of a periodical entitled "Rhetorical Abstracts" that would contain abstracts of articles and books in rhetoric and in other disciplines of interest to rhetoricians. The task has always seemed impossible because of limited time and personnel. But if a very fast abstracting program could be developed, such a periodical could be produced with very little output of human energy. Or, an abstract version of *Vital Speeches* could be produced even more easily.

Before leaving the subject of information retrieval, let me mention a New York Times News Service release of November 29. Published in the Austin American under the headline "IBM and LBJ", it begins as follows:

> "The Democratic National Committee Sunday displayed America's first fully-automated national political machine, a room-sized . . . IBM 1401 computer system capable of performing almost every campaign chore.

"Its nickname, naturally, is Lyndon.

"This computer, with its tape drives, card input devices, printers, and central processing units, can count the contributions, run the surveys, write the personalized form letters, distribute the propaganda, and mobilize the volunteers."

It goes on to say:

"In 1964, Barry Goldwater's managers bought an 'electronic selector' to provide quick access to his statements on various issues. The device is now being used in the research section of the Republican National Committee."[5]

Surely devices such as these have enormous implications for the study of invention and audience adaptation. Any rhetorician setting out to study the 1968 presidential campaigns, certainly should find out all he could about these two information retrieval systems.

Turning now from information retrieval, a third application of computers in rhetoric and public address is *content and stylistic analysis*. The simplest sort of stylistic analysis, of course, is counting words — but this kind of research has never enjoyed very great favor among students of public address. One reason is that the amount of useful information that can be extracted from such a count is very small in comparison to the effort one must expend to get it. Moreover, any one of these statistics is hard to interpret standing alone.[6] But what if the information were very easy to get, so that one could compile a wealth of language statistics for different parts of the speech, and for speeches delivered under different circumstances, by different speakers, within different movements, or in different periods of history, wouldn't it be interesting to accumulate some norms and make some comparisons? Is there a distinctive rhythm pattern that characterized early civil rights oratory? Did Harry Emerson Fosdick really use more personal pronouns than most preachers of his day, and did he influence his successors to follow suit? Do ultraconservative groups actually use an abnormally high ratio of religious symbols? In what ways did Stevenson's language differ from that of the common man? These are questions that are answered more easily—and more definitely—by quantitative analyses of language than by any other means. Moreover, in a day when ghostwriting has become a major industry, computers programmed for author identification can use stylistic analysis as detection aids. This would allow us to place the blame—or praise—for a given speech squarely where it belongs.[7]

We have seen that EDP systems can be used for numerical calculations, as in statistical operations, and for processing verbal materials, as in information retrieval and stylistic or content analysis. An entirely different sort of use is what has come to be called *simulation*. Nowadays, most airplanes are flown symbolically inside a computer before the prototype is ever built. The hulls of sailing ships are sailed electronically before their design is finalized. In a large industry, a departmental reorganization is sometimes tried out on a computer before it is put into effect. Economists work with complex models of industries or even of the entire U. S. economy, calculating the probable effects of increasing the production of this or lowering the price of that.

Now, in any complex and dynamic process, such as the motion of a solid shape through air or water, or the interaction patterns among employees, or the chain-reaction of wage and price factors, calculating the effect of changing a single variable is never a onestep process. Because effects interact with one another, the impact of a particular change may be felt in a cumulative way over a period of time, or it may even set up a cycle of effects that repeat themselves over and again. What is required to predict probable effects in such complex cases as these, is a dynamic model in which the whole chain of interactions can be allowed to work itself out. Where the relevant operations are quantitative, the computer can calculate values, where they are nonquantitative, it can manipulate symbols according to whatever rules the model specifies.

It seems to me that the simulation capability of computers is of enormous significance for rhetoric. Already, processes bordering on the rhetoric have been simulated. At the time of his death, Paul Deutschman was working on a simulation of information diffusion in underdeveloped nations. Turner and Carlsmith developed a simulation of community referendum elections. Several groups are at work on simulations of complex persuasion situations.[8]

One could predict that a cooperative attack by a group of rhetoricians and computermen could now produce a simulation of audience response to public address in a number of dimensions—information gain, attitude change, verbal behavior, speaker image, and audience value systems—and that this simulation would be able to predict these effects for certain kinds of public speeches at least as well as the average Speech I student. But if it can't do any better than that, why bother? Consider. If we give the computer some input information about the characteristics of the audience, the situation, and the speech, and give it a set of instructions (representing our theory) for processing this information to estimate the impact of the speech, and if the computer then comes up with a manifestly ridiculous answer, then something must have been wrong with the instruc-

tions. That is, we did not understand how the audience and the speech would interact in that situation after all. Thus, one advantage of simulation is that it provides us with a way of identifying subtly ridiculous propositions by the manifestly ridiculous results they produce.

A second great advantage of simulation is that it forces us to objectify our theory, that is, to reduce it to statements that a very literal-minded idiot (a computer) can read. That exercise in itself is something of an eye-opener, even in purely quantitative areas—and where verbal theory is concerned, it produces an entirely new kind of self-awareness. I remember my own shock when I realized that I really did not know exactly what I was doing when I rank-ordered a set of numbers; imagine what it will be like when a rhetorician first tries to explain to a 1401 just what an outline is. No doubt the effort will have salutory effects on both parties; but in any case, the rhetorician will gain, for he will understand exactly what he means when he uses that term, and in a clarity of detail that he could not now imagine.

The advantages of simulation to complex theories like rhetoric are too substantial to be ignored. Within five years, some of the readers of this journal will be modeling some aspects of rhetorical theory with computers, and simulating speakers or audiences or both.

Having now strained my predictions beyond all credibility, I might as well take the final step. As a fifth application of computers in rhetorical theory and public address, I foresee the computer as a sort of *low-grade creative thinker*.

Most of us are aware that computers compose poetry, from the worst doggerel to blank verse—verse that, if written by a man, would be thought to reflect some remarkable insights. But I am talking about a level of creativity somewhat below that. For example, consider the recent change of name for the Cities Service Gasoline Company. According to one report, the new name of the company—Citgo—was invented by a computer. I have been unable to confirm this story, but it is not hard to imagine how the first stages of invention could have been handled by machine. One could take all of the letters in the name "Cities Service Gasoline," and combine them in every order that would yield strings of letters compatible with English phonotactics. A subroutine could be written to screen out those that are too long or too short, or which repeat syllables. Eventually such reductions would produce a list of perhaps twenty-five names. Some of these could be eliminated right away on intuitive or aesthetic grounds, leaving perhaps no more than a dozen candidates. These could then be compared by standard public relations or market analysis procedures. Note that the final decision is made by reference to human values—but the brain-storming and the rough screening could be done—thoroughly and rapidly—by machine, and no possibilities would be overlooked.

Now, rhetoricians are not in the business of naming industrial products, so what has all of this to do with us? Just as words are made up of letters, so sentences are made up of words. The same programs that I use to generate words out of letters can be used with modifications to generate sentences out of words. Both rhetorical theory and rhetorical criticism consist of propositions—that is, sentences. I see no reason why, in principle, a computer could not be assigned the job of generating theoretical or critical sentences using certain terms and subject to specified restraints.

Of course, most of what the computer had to say about speeches and speechmaking would be banal, and most of the rest would be nonsense. But isn't it possible that the machine would make a few original and useful observations on speeches and speechmaking?

On a small scale, I have experimented with simulation of computer-generated critical ideas, based on comments by students in advanced speech classes. They have shown that the average student uses his critical vocabulary in a very limited way. It is almost as if he were strait-jacketed by his own verbal habits. That is, given the number of things that he talks about when criticizing a speech, he *could* say much more, if he would do no more than combine the elements he already uses, in a greater variety of ways. A glance at some arbitrary manipulations of his own language sometimes seems to open up to him possibilities that he had not seen before. In this case, the arbitrary manipulations were performed by hand-simulation of machine processes, but they could have been done even more easily by machine.

One might imagine a sort of creative editorial process for rhetorical theorists and critics. Having done your paper on a certain speech or speaker, you read it into the computer, perhaps along with excerpts from rhetorical theory or from other rhetorical criticisms. The machine divides the sentences, recombines their elements under certain constraints, and asks you a series of questions. Most of these questions will be useless; but one or two may be priceless. How much are one or two really good questions worth?

I have tried to suggest that the potential contribution of computers to rhetoric and public address is substantial, and that the future which EDP portends has already arrived.

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